AFS
JFW

Doc Code: AP.PRE.REQ

PTO/SB/33 (07-05)
Approved for use through xx/xx/200x. OMB 0651-00xx
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

PRE-APPEAL BRIEF REQUEST FOR REVIEW

Docket Number (Optional): 125695-1/YOD (GERD:0255)

I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to "Mail Stop AF, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450" [37 CFR 1.8(a)]

on September 25, 2006

Signature: Lynda Howell

Typed or printed name: Lynda Howell

Application Number	Filed
10/671,143	September 25, 2003

First Named Inventor: Ji U. Lee

Art Unit	Examiner
1753	Rodney G. McDonald

Applicant requests review of the final rejection in the above-identified application. No amendments are being filed with this request.

This request is being filed with a notice of appeal.

The review is requested for the reason(s) stated on the attached sheet(s).
Note: No more than five (5) pages may be provided.

I am the

- [ ] applicant/inventor.
- [ ] assignee of record of the entire interest. See 37 CFR 3.71. Statement under 37 CFR 3.73(b) is enclosed. (Form PTO/SB/96)
- [X] attorney or agent of record. Registration number 37,479
- [ ] attorney or agent acting under 37 CFR 1.34. Registration number if acting under 37 CFR 1.34 _____

Signature

Patrick S. Yoder
Typed or printed name

(281) 970-4545
Telephone number

September 25, 2006
Date

NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required. Submit multiple forms if more than one signature is required, see below*.

[X] *Total of 1 forms are submitted.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: Ji U. Lee et al.	§	
	§	Group Art Unit: 1753
Serial No.: 10/671,143	§	
	§	Examiner: Rodney G. McDonald
Filed: September 25, 2003	§	
	§	
For: SELF-ALIGNED GATED CARBON NANOTUBE FIELD EMITTER STRUCTURES AND ASSOCIATED METHODS OF FABRICATION	§	Atty. Docket: 125695-1/YOD GERD:0255

Mail Stop AF
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

CERTIFICATE OF MAILING
37 C.F.R. 1.8

I hereby certify that this correspondence is being deposited with the U.S. Postal Service with sufficient postage as First Class Mail in an envelope addressed to: Commissioner for Patents, Mail Stop AF, P.O. Box 1450, Alexandria, VA 22313-1450, on the date below:

September 25, 2006 — Lynda Howell
Date — Lynda Howell

PRE-APPEAL BRIEF REQUEST FOR REVIEW

In respect to the Final Office Action of July 24, 2006, Appellants respectfully submit this Pre-Appeal Brief Request for Review. This Request is being filed concurrently with a Notice of Appeal.

The application includes three independent claims, namely claims 1, 32 and 99. The Final Office Action summarized claims 1-2 claims 1-6, 9, 13-19, 22-27, 29, 31-38, 42-48, 51, 52, 54-56 and 99 as rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,339,281 (hereinafter "Lee") in view of the U.S. Patent Application Publication No. 2004/0067602 (hereinafter "Jin"). This was the only rejection affecting the independent claims.

Claim 1 recites a method for fabricating a self–aligned gated carbon nanotube field emitter structure. The method includes providing a substrate having a surface, depositing a dielectric material on the surface of the substrate, where the dielectric material has a surface. The method further includes depositing a conductor layer on the surface of the dielectric material, where the conductor layer has a surface, selectively etching the conductor layer to form an opening in the conductor layer, selectively etching the dielectric material to form a micro-cavity in the dielectric material. Further, a base layer structure is deposited in the micro-cavity adjacent to the surface of the substrate, wherein the base layer structure has a surface, and where the base layer structure has a substantially conical shape, a catalyst is deposited on a portion of the surface of the base layer structure, wherein the catalyst is suitable for growing at least one carbon nanotube. Furthermore, *an electrical potential is applied to the substrate and the conductor layer*, where the electrical potential generates a plurality of electrical field lines that are deflected around the surface of the base layer structure, and wherein the plurality of electrical field lines have a strength that is greatest in a direction substantially perpendicular to the surface of the substrate, and at least one carbon nanotube is grown from the catalyst in the presence of the plurality of electrical field lines, where the at least one carbon nanotube is grown in a direction substantially perpendicular to the surface of the substrate. Claims 1-31 depend directly or indirectly from claim 1.

Claim 32 recites a method for fabricating a triode carbon nanotube field emitter structure. The method includes providing a cathode electrode having a surface, depositing a dielectric layer on the surface of the cathode electrode, where the dielectric layer has a surface, depositing a gate electrode on the surface of the of the dielectric layer, where the gate electrode has a surface. The method further includes selectively etching the gate electrode to form an opening in the gate electrode, selectively etching the dielectric layer to form a micro-cavity in the dielectric layer, depositing a conductive base layer structure in the micro-cavity adjacent to the surface of the cathode electrode. The conductive base layer structure has a surface, and where the conductive base layer structure has a substantially

conical shape. A catalyst is deposited on a portion of the surface of the conductive base layer structure, where the catalyst is suitable for growing at least one carbon nanotube. The method further includes *applying an electrical potential to the cathode electrode and the gate electrode*, where the electrical potential generates a plurality of electrical field lines that are deflected around the surface of the conductive base layer structure, and where the plurality of electrical field lines have a strength that is greatest in a direction substantially perpendicular to the surface of the cathode electrode, and growing at least one carbon nanotube from the catalyst in the presence of the plurality of electrical field lines, where the at least one carbon nanotube is grown in a direction substantially perpendicular to the surface of the cathode electrode. Claims 33-57 depend directly or indirectly from claim 32.

Claim 99 recites a method for fabricating a self-aligned gated carbon nanotube field emitter structure. The method includes, *inter alia, applying an electrical potential to the substrate and the conductor layer*, where the electrical potential generates a plurality of electrical field lines that are deflected around the surface of the base layer structure, and wherein the plurality of electrical field lines have a strength that is greatest in a direction substantially perpendicular to the surface of the substrate, and growing at least one carbon nanotube from the catalyst in the presence of the plurality of electrical field lines, wherein the at least one carbon nanotube is grown in a direction substantially perpendicular to the surface of the substrate.

The step of applying an electric potential as recited in each of the independent claims and disclosed in the present application requires applying the electric potential to the substrate and the conductive layer. The application of the electric potential results in a plurality of electric field lines being established in each of the plurality of micro-cavities. The carbon nanotubes grow in the direction of the highest field lines.

In rejecting the independent claims, the Examiner relied upon Lee to teach a method for fabricating a triode carbon nanotube field emitter array. The Examiner

recognized that Lee does not teach applying an electric potential to the substrate to grow nanotubes. The Examiner relied upon Jin to teach a method of growing nanowires from a catalyst by CVD utilizing *a globally applied field* along the vertical direction (perpendicular to the substrate) or by an intrinsically present electric field (perpendicular to the substrate) to produce vertically grown nanowires.

The combination of Lee and Jin does not teach the step of applying a potential *to a substrate and a conductive layer.*

Jin teaches applying an electric field globally along the vertical direction or by an intrinsically present electric field (see, paragraph 50, lines 4-8). Jin fails to teach the step of applying a potential between a substrate and a conductive layer during the growth of the nanotubes. Application of electric field globally or intrinsically cannot be considered equivalent to applying a potential to the substrate and the conductive layer. The combination of Lee and Jin would suggest placing the *entire structure* of Lee in the CVD chamber of Jin, subjected to an external electric field, or to the electric field present inside the CVD chamber.

Rebuttal of the Examiner's Response to Arguments

The Examiner's response to the Appellants' earlier arguments, summarized above, make clear that the Examiner has misinterpreted the Jin reference with regard to application of electric field during the growth of the nanowires. The Examiner seems to be reading the claims of the present application as requiring simply creating an electric field. The claims of the present application, rather, clearly recite applying a potential to the substrate and the conductive layer. The combination of Jin and Lee would at the best suggest the application of the electric field globally or intrinsically. The combination would not suggest applying a potential to the substrate and the conductive layer during the growth of the nanotubes.

In the Examiner's Response to Arguments, the Examiner mentioned that the Appellants' claims require "applying an electrical potential to the substrate and the conductor layer". Further, the Examiner mentioned Jin teaches applying an electrical potential to the substrate and the conductor in an electrical field that is either global or intrinsically present. The Examiner further argued that the claim does not recite that the electrical field is "between" the substrate and the conductive layer, however, the electrical field would run between the substrate and the conductor layer due to the shape of the electrical field.

The Examiner has apparently failed to appreciate the difference between having an electrical field that is globally or intrinsically applied versus applying a potential to the arrangement having the substrate and the conductive layer to *in-situ* generate an electric field. Appellants believe that the step of applying an electrical potential to the substrate and the conductive layer is a completely new and non-obvious feature of the invention.

For all of the above reasons, Appellants respectfully request that the Panel instruct the Examiner to withdraw the outstanding rejections and allow the pending claims.

Respectfully submitted,

Date: 9/25/2006

Patrick S. Yoder
Reg. No. 37,479
FLETCHER YODER
P.O. Box 692289
Houston, TX 77269-2289
(281) 970-4545